MA 162 **Russell Brown**
Exam 1 **12 February, 1993**

Answer all of the following questions. Use the backs of the question papers for scratch paper. Additional sheets are available if necessary. No books or notes may be used. When answering these questions, please be sure to 1) check answers when possible, 2) clearly indicate your answer and the reasoning used to arrive at that answer **(unsupported answers will receive NO credit)**, and 3) label all variables and equations.

Question	Score	Total
1		20
2		20
3		20
4		20
5		20
Total		100

Name ____

Section ______________________

1. A company packages raisins and peanuts to make two types of packages. The D-package contains 2 oz. of peanuts and 1 oz. of raisins and the E-package contains 1 oz. of peanuts and 1 oz. of raisins.

   a) Suppose that the company has 15 oz. of peanuts and 9 oz. of riasins. Write a system of linear equations whose solution is the number of each type of package they should fill in order to use up all of their peanuts and raisins.

   b) Solve the system you wrote down in part a).

2. a) Find the inverse of the matrix

$$\begin{bmatrix} 1 & 0 & 1 \\ -1 & 1 & 1 \\ 2 & 0 & 1 \end{bmatrix}$$

b) Use your answer to part a) to solve the system

$$\begin{array}{rrrcr} x & & +z & = & 2 \\ -x & +y & +z & = & -2 \\ 2x & & +z & = & 0 \end{array}$$

3. a) Find all solutions to the system

$$\begin{array}{rrrcl} x & +y & & = & 2 \\ x & +2y & +z & = & 4 \end{array}$$

by expressing x and y in terms of z.

b) Find the solution to the system in a) with $z = 1$.

4. Let

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \qquad B = \begin{bmatrix} 1 \\ 2 \end{bmatrix} \qquad C = \begin{bmatrix} 3 & 4 \end{bmatrix}$$

Compute the following, if possible. If an operation is not possible, explain why.

a) $A + B$

b) $A \cdot B$

c) $A + B \cdot C$

d) Find x and y so that

$$A + \begin{pmatrix} x & 1 \\ 2 & y \end{pmatrix} = \begin{pmatrix} 0 & 3 \\ 5 & 0 \end{pmatrix}$$

5. On the graph below, the lines $x + y = 2$, $\quad x = 2y$ and $x + y = 4$ are drawn.

a) Shade the feasible set
$$\begin{gathered} x + y \geq 2 \\ x + y \leq 4 \\ x \leq 2y \\ x \geq 0, \quad y \geq 0. \end{gathered}$$

b) Is the point $(2, 4)$ feasible? Why or why not?